REMARKS

Reconsideration and withdrawal of the objections and rejections set forth in the above-mentioned Official Action in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 19-34 are now pending in the application, with Claims 19 and 27 being independent. Claims 1-18 have been cancelled without prejudice or disclaimer of the subject matter recited therein. Claims 19-34 are newly-presented herein.

The specification was objected to for minor informalities. The specification has been amended herein in the manner suggested by the Examiner. Accordingly, reconsideration and withdrawal of the objection to the specification are respectfully requested.

Claims 8, 12, 13 and 18 were also objected to for minor informalities. Since these claims have been cancelled without prejudice or disclaimer, the objection to the claims is deemed moot. In addition, the Examiner's comments were taken into consideration in drafting the new claims. Favorable consideration is requested.

Claims 1-7 and 10-16 were rejected under 35 U.S.C. § 103 as being unpatentable over by U.S. Patent No. 6,115,564 (Morimoto) in view of U.S. Patent No. 4,447,856 (Takahashi et al.). Claims 9 and 18 were rejected under § 103 as being unpatentable over Morimoto in view of Takahashi et al. and further in view of U.S. Patent No. 6,415,118 (Setoriyama et al.). Claims 8 and 17 were rejected under § 103 as being unpatentable over Morimoto in view of Takahashi et al. and further in view of Japanese Laid-Open Patent Application No. 2000-216580 (Masayoshi). These rejections are respectfully traversed.

As recited in independent Claim 19, the present invention relates to an image forming apparatus. The apparatus includes an image forming means, a first electrical substrate, a second electrical substrate, an opening for discharging heat and a guiding member. The image forming means forms an image. The first electrical substrate has an electric circuit for electric power supply to the image forming means. The second electrical substrate is disposed above the first electrical substrate and has an electric circuit for operating the image forming means. The opening discharges heat to outside of the image forming apparatus. The guiding member, disposed between the first electrical substrate and the second electrical substrate, guides heat of the first electrical substrate to the opening, the guiding member having an inclined portion inclined upwardly toward the opening.

As recited in independent Claim 27, the present invention relates to an image forming apparatus. The apparatus includes an image forming means, a first electrical substrate, a second electrical substrate, an opening for discharging heat and an air flow forming member. The image forming means forms an image. The first electrical substrate has an electric circuit for electric power supply to the image forming means. The second electrical substrate is disposed above the first electrical substrate and has an electric circuit for operating the image forming means. The opening discharges heat to outside of the image forming apparatus. The air flow forming member, disposed between the first electrical substrate and the second electrical substrate, directs heat of the first electrical substrate to the opening, the air flow forming member having an inclined portion inclined upwardly toward the opening.

When plural electrical substrates are provided in an image forming apparatus, heat transfer occurs between the substrates. This is particularly the case when the substrates are arranged vertically adjacent one another. Although a guide can be provided from a lower substrate toward an opening at an upper portion of the apparatus, heat may stagnate in the guide. With the claimed arrangements, however, such stagnation can be prevented.

Morimoto is directed to an image forming apparatus having a control circuit board 33 disposed below a power circuit board 34. An air suctioning fan 31 is arranged inside air inlet port 29. Air drawn in from outside by the fan abuts a slanted member 35 so that the air can be diffused and flow uniformly inside the apparatus. Drawn air passes by circuit boards 33 and 34 and is thereafter exhausted with heat from a heat roller 32.

However, Morimoto does not disclose or suggest a guiding member, disposed between first and second electrical substrates, for guiding heat of the first electrical substrate to an opening, with the guiding member having an inclined portion inclined upwardly toward the opening, as is recited in independent Claim 19. Nor does Morimoto disclose or suggest an air flow forming member, disposed between the first and second electrical substrates, for directing heat of the first electrical substrate to an opening, with the air flow forming member having an inclined portion inclined upwardly toward the opening, as is recited in independent Claim 27.

Thus, Morimoto fails to disclose or suggest important features of the present invention recited in independent Claims 19 and 27.

Takahashi et al. is directed to a shelf unit in an electronic communication device. Plural shelf units 10 are accommodated in a cabinet 1. Openings 40 and space 41 are provided for flow of hot air. Shelf unit 10 includes a V-shaped top plate 13. Initially, Takahashi et al. is not directed to an image forming apparatus with plural electrical substrates, and therefore one of ordinary skill in the art would not look to Takahashi et al. to modify Morimoto. Furthermore, even if Morimoto were modified with the teachings of Takahashi et al., the resulting combination also would not teach or suggest a guiding member or air flow forming member, disposed in the first and second electrical substrates, for guiding or directing heat of the first electrical substrate to the opening, with the member having an inclined portion inclined upwardly toward the opening, as is recited in independent Claims 19 and 27.

Thus, Takahashi et al. fails to remedy the deficiencies of Morimoto noted above with respect to the independent claims.

Setoriyama et al. was cited for teaching components in an image forming apparatus having heat insulation capabilities. Masayoshi was cited for teaching a duct and heat exhaust device in an image forming apparatus. However, they are not believed to remedy the deficiencies of the citations noted above with respect to the independent claims.

Accordingly, independent Claims 19 and 27 are patentable over the citations of record. Reconsideration and withdrawal of the § 103 rejections are respectfully requested.

For the foregoing reasons, Applicants respectfully submit that the present invention is patentably defined by independent Claims 19 and 27. Dependent Claims 20-26 and 28-34 are also allowable, in their own right, for defining features of the present invention in addition to those recited in their respective independent claims. Individual consideration of the dependent claims is requested.

Applicants submit that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowability are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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